

## ABSTRACT OF THE DISCLOSURE

An improved  $\epsilon$ -removal method is disclosed that computes for any input weighted automaton A with  $\epsilon$ -transitions an equivalent weighted automaton B with no  $\epsilon$ -transitions. The method comprises two main steps. The first step comprises computing for each state "p" of the automaton A its  $\epsilon$ -closure. The second step in the method comprises modifying the outgoing transitions of each state "p" by removing those labeled with  $\epsilon$ . The method next comprises adding to the set of transitions leaving the state "p" non- $\epsilon$ -transitions leaving each state "q" in the set of states reachable from "p" via a path labeled with  $\epsilon$  with their weights pre- $\otimes$ -multiplied by the  $\epsilon$ -distance from state "p" to state "q" in the automaton A. State "p" is a final state if some state "q" within the set of states reachable from "p" via a path labeled with  $\epsilon$  is final and the final weight  $\rho[p] = \bigoplus_{q \in e[p] \cap F} (d[p, q] \otimes \rho[q])$ .